# Refine Search

## Search Results -

| Terms | Documents |
|---|---|
| L1 same memory same cache | · 97 |

**Database:**

```
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
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JPO Abstracts Database
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IBM Technical Disclosure Bulletins
```

**Search:**

```
L2
```

[Refine Search]

[Recall Text ⬍]   [Clear]   [Interrupt]

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## Search History

**DATE:   Tuesday, May 10, 2005**    Printable Copy    Create Case

| Set Name | Query | Hit Count | Set Name |
|---|---|---|---|
| side by side | | | result set |
| | *DB=PGPB,USPT,USOC; PLUR=YES; OP=OR* | | |
| L2 | L1 same memory same cache | 97 | L2 |
| L1 | ((disk or disc) near5 controller) same switch | 2129 | L1 |

END OF SEARCH HISTORY

# Refine Search

## Search Results -

| Terms | Documents |
|---|---|
| (709/229 \|709/232 \|709/253 \|710/313 \|710/316 \|710/104 \|710/74 \|710/1 \|710/305 \|711/112 \|711/113 \|711/114 \|711/147 \|711/148 \|711/130 \|714/3 \|714/7).ccls. | 12998 |

**Database:**
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Derwent World Patents Index
IBM Technical Disclosure Bulletins

**Search:** L1

Refine Search

Recall Text    Clear         Interrupt

## Search History

**DATE: Tuesday, May 10, 2005**   Printable Copy   Create Case

| Set Name Query | Hit Count | Set Name |
|---|---|---|
| side by side | | result set |
| *DB=PGPB,USPT,USOC; PLUR=YES; OP=OR* | | |
| L1   710/313,316,104,74,1,305;711/112-114,147,148,130;714/3,7;709/229,232,253.ccls. | 12998 | L1 |

END OF SEARCH HISTORY

# Refine Search

## Search Results -

| Terms | Documents |
|-------|-----------|
| L2 | 0 |

**Database:**

US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

**Search:**

L3

[Refine Search]

[Recall Text] [Clear] [Interrupt]

## Search History

**DATE:  Tuesday, May 10, 2005     Printable Copy    Create Case**

| Set Name | Query | Hit Count | Set Name |
|----------|-------|-----------|----------|
| side by side | | | result set |
| | *DB=EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR* | | |
| L3 | L2 | 0 | L3 |
| | *DB=PGPB,USPT,USOC; PLUR=YES; OP=OR* | | |
| L2 | L1 same memory same cache | 97 | L2 |
| L1 | ((disk or disc) near5 controller) same switch | 2129 | L1 |

END OF SEARCH HISTORY

# Refine Search

## Search Results -

| Terms | Documents |
|-------|-----------|
| L1 and L3 | 50 |

**Database:**

US Pre-Grant Publication Full-Text Database
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US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

**Search:**

L4

[Refine Search]

[Recall Text] [Clear] [Interrupt]

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## Search History

**DATE:   Tuesday, May 10, 2005     Printable Copy     Create Case**

| Set Name | Query | Hit Count | Set Name |
|----------|-------|-----------|----------|
| side by side | | | result set |
| | *DB=PGPB,USPT,USOC; PLUR=YES; OP=OR* | | |
| L4 | l1 and L3 | 50 | L4 |
| L3 | L2 same memory same cache | 97 | L3 |
| L2 | ((disk or disc) near5 controller) same switch | 2129 | L2 |
| L1 | 710/313,316,104,74,1,305;711/112-114,147,148,130;714/3,7;709/229,232,253.ccls. | 12998 | L1 |

END OF SEARCH HISTORY

# Refine Search

### Search Results -

| Terms | Documents |
|---|---|
| L5 and (host or CPU).ab. | 29 |

**Database:**
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

**Search:** L7

[Refine Search]

[Recall Text] [Clear]          [Interrupt]

### Search History

**DATE:  Tuesday, May 10, 2005    Printable Copy    Create Case**

| Set Name | Query | Hit Count | Set Name |
|---|---|---|---|
| side by side | | | result set |
| | *DB=USPT; PLUR=YES; OP=OR* | | |
| L7 | L5 and (host or CPU).ab. | 29 | L7 |
| L6 | L5 same (host or CPU) | 146 | L6 |
| L5 | L4 same interfac$3 | 242 | L5 |
| L4 | (disk adj1 controller) same switch | 526 | L4 |
| L3 | (5155835| 5206939| 5237573| 5499981| 5583876| 5819054| 5822779)![pn] | 7 | L3 |
| L2 | (4476526| 5142627| 5335352| 6065096| 6094728)![pn] | 5 | L2 |
| L1 | 6385681.pn. or 6578108.pn. | 2 | L1 |

END OF SEARCH HISTORY

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**Search Results**  BROWSE  SEARCH  IEEE XPLORE GUIDE  SUPPORT

Results for "( disk<in>metadata ) <and> ( controller<in>metadata ) <and> ( switch and in..."  ✉ e-mail  🖨 printer friendly
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» Key

Modify Search

| ( disk<in>metadata ) <and> ( controller<in>metadata ) <and> ( switch and interfac*<i | >> |

☐ Check to search only within this results set

Display Format:  ⦿ Citation  ○ Citation & Abstract

| | |
|---|---|
| IEEE JNL | IEEE Journal or Magazine |
| IEE JNL | IEE Journal or Magazine |
| IEEE CNF | IEEE Conference Proceeding |
| IEE CNF | IEE Conference Proceeding |
| IEEE STD | IEEE Standard |

Select  Article Information

☐ 1. **An ASIC RISC-based I/O processor for computer applications**
Cates, R.L.; Farrell, J.J., III;
Euro ASIC '90
29 May-1 June 1990 Page(s):50 - 55

AbstractPlus | Full Text: PDF(484 KB)  IEEE CNF

☐ 2. **Synchronous servo-drive: a compact solution of control problems by means of a single-chip microcomputer**
Naunin, D.; Reuss, H.-C.;
Industry Applications, IEEE Transactions on
Volume 26, Issue 3, May-June 1990 Page(s):408 - 414

AbstractPlus | Full Text: PDF(348 KB)  IEEE JNL

☐ 3. **Disk system architectures for high performance computing**
Katz, R.H.; Gibson, G.A.; Patterson, D.A.;
Proceedings of the IEEE
Volume 77, Issue 12, Dec. 1989 Page(s):1842 - 1858

AbstractPlus | Full Text: PDF(1644 KB)  IEEE JNL

☐ 4. **Synchronous servodrive: a very compact solution of control problems by means of a single-chip-microcomputer**
Naunin, D.; Reuss, H.-C.;
Industry Applications Society Annual Meeting, 1988., Conference Record of the 1988 IEEE
2-7 Oct. 1988 Page(s):266 - 271 vol.1

AbstractPlus | Full Text: PDF(404 KB)  IEEE CNF

☐ 5. **90 mm rewritable optical disk drive**
Nakane, K.; Ogawa, M.; Yoshimoto, K.; Ogura, M.; Kiyose, Y.; Furukawa, T.;
Consumer Electronics, IEEE Transactions on
Volume 38, Issue 3, Aug 1992 Page(s):648 - 653

AbstractPlus | Full Text: PDF(532 KB)  IEEE JNL

☐ 6. **Single chip CD decoder**
Finck, R.; Schulze, W.;
Consumer Electronics, IEEE Transactions on
Volume 36, Issue 2, May 1990 Page(s):89 - 91

AbstractPlus | Full Text: PDF(156 KB)  IEEE JNL

☐ 7. **Output feedback sliding mode control for the flying height of a pickup head in near-field optical disk drives**
Wu, W.C.; Liu, T.S.;
Control Theory and Applications, IEE Proceedings-
Volume 150, Issue 6, 21 Nov. 2003 Page(s):629 - 635

AbstractPlus | Full Text: PDF(316 KB)   IEEE JNL

8.  **Setting up and using a multi-computer VXIbus system**
    Wright, M.;
    AUTOTESTCON '97. 1997 IEEE Autotestcon Proceedings
    22-25 Sept. 1997 Page(s):568 - 574

    AbstractPlus | Full Text: PDF(552 KB)   IEEE CNF

9.  **Development of a software package for a flexible link manipulator**
    Kwok, N.M.; Lee, C.K.;
    Advanced Motion Control, 2000. Proceedings. 6th International Workshop on
    30 March-1 April 2000 Page(s):58 - 63

    AbstractPlus | Full Text: PDF(580 KB)   IEEE CNF

10. **Performance analysis of storage and network subsystems in cluster architectures**
    Cristaldi, R.; Iannello, G.;
    Cluster Computing, 2000. Proceedings. IEEE International Conference on
    28 Nov.-1 Dec. 2000 Page(s):335 - 344

    AbstractPlus | Full Text: PDF(792 KB)   IEEE CNF

11. **Redundant arrays of IDE drives**
    Sanders, D.A.; Cremaldi, L.A.; Eschenburg, V.; Lawrence, C.N.; Riley, C.; Summers, D.J.; Petravick, D.L.;
    Nuclear Science Symposium Conference Record, 2001 IEEE
    Volume 1,  4-10 Nov. 2001 Page(s):515 - 518 vol.1

    AbstractPlus | Full Text: PDF(238 KB)   IEEE CNF

12. **SPEK: a storage performance evaluation kernel module for block level storage systems**
    Zhang, M.; Yang, Q.; He, X.;
    Modeling, Analysis and Simulation of Computer Telecommunications Systems, 2003. MASCOTS 2003. 11th IEEE/ACM
    International Symposium on
    12-15 Oct. 2003 Page(s):88 - 95

    AbstractPlus | Full Text: PDF(318 KB)   IEEE CNF

13. **A man-machine interface software system for the design, modeling and simulation of robotic and automation systems**
    Patten, J.; Frazier, J.;
    Robotics and Automation. Proceedings. 1987 IEEE International Conference on
    Volume 4,  Mar 1987 Page(s):837 - 841

    AbstractPlus | Full Text: PDF(512 KB)   IEEE CNF

14. **The design of an intelligent transparent speech interface**
    Tough, C.;
    Systems and Applications of Man-Machine Interaction Using Speech I/O, IEE Colloquium on
    18 Mar 1991 Page(s):2/1 - 2/4

    AbstractPlus | Full Text: PDF(268 KB)   IEE CNF

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**Disk system architectures for high performance computing**

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Katz, R.H.  Gibson, G.A.  Patterson, D.A.
Dept. of Electr. Eng. & Comput. Sci., California Univ., Berkeley, CA, USA;

Abstract
Following a brief review of the fundamentals of **disk** system architecture, the characteristics of the applications that demand high I/O system performance are described. Conventional ways to improve **disk** performance are discussed. New developments in **disk** array systems are introduced, and **controller** architectures are described

Index Terms
Inspec

Controlled Indexing
computer interfaces  controllers  magnetic disc storage

Non-controlled Indexing
controller architectures  disk array systems  disk performance  disk system architecture  high I/O system
performance  high performance computing  magnetic disc storage

Author Keywords
Not Available

References

No references available on IEEE Xplore.

Citing Documents

1    Disk-based storage for scalable video, Ed Chang; Zakhor, A.
     *Circuits and Systems for Video Technology, IEEE Transactions on*
     On page(s): 758-770, Volume: 7, Issue: 5, Oct 1997

# IEEEXplore# Disk system architectures for high performance computing

Abstract | Full Text: PDE (364)

2    Block-oriented compression techniques for large statistical databases, Wee-Keong Ng; Ravishankar, C.V.
*Knowledge and Data Engineering, IEEE Transactions on*
On page(s): 314-328, Volume: 9, Issue: 2, Mar/Apr 1997
Abstract | Full Text: PDE (408)

3    Adaptive prefetching and storage reorganization in a log-structured storage system, Chye Lin Chee; Hongjun Lu; Hong Tang; Ramamoorthy, C.V.
*Knowledge and Data Engineering, IEEE Transactions on*
On page(s): 824-838, Volume: 10, Issue: 5, Sep/Oct 1998
Abstract | Full Text: PDE (600)

4    A performance evaluation of RAID architectures, Shenze Chen; Towsley, D.
*Computers, IEEE Transactions on*
On page(s): 1116-1130, Volume: 45, Issue: 10, Oct 1996
Abstract | Full Text: PDE (1360)

5    Design of fault-tolerant large-scale VOD servers: With emphasis on high-performance and low-cost, Golubchik, L.; Muntz, R.R.; Cheng-Fu Chou; Berson, S.
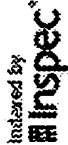*Parallel and Distributed Systems, IEEE Transactions on*
On page(s): 363-386, Volume: 12, Issue: 4, Apr 2001
Abstract | Full Text: PDE (1720)

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L2: Entry 97 of 97                              File: USPT                    Oct 9, 1984

DOCUMENT-IDENTIFIER: US 4476526 A
** See image for **Certificate of Correction** **
TITLE: Cache buffered memory subsystem

Detailed Description Text (15):
As discussed above, in a preferred embodiment of the invention, it is configured as an add-on
subsystem to a previously existing product, namely the model 8880 disk controller manufactured
by the assignee of the present invention, Storage Technology Corporation. In this embodiment,
the director 12 performs the functions of the director in the Model 8880; that is, it directs
and interfaces to the control module which demultiplex the data to serial form thus directly
interfacing the drives themselves, to the host channels thus converting the data from the form
in which it is stored on disk to one to which the channel can respond. The director according
to the invention performs the additional buffering functions of buffered data transfer, and
execution of the stage and destage operations, i.e., writing of data from the disk via the
control module into the cache buffer 30. The director also provides buffer error recovery
systems, which amount to bypassing of the buffer in favor of direct transfer of data from the
disk to channel interface, and the director communicates with the buffer manager. That is to
say, the director performs switching functions, controlling the flow of data between the file
interface to which is connected the control module and thence the disk units, the cache buffer
30, and the channel interface to which is connected the host computer. These switching
functions are controlled in accordance with instructions received over a control interface 64
from the buffer manager 32. Thus, in the preferred embodiment in which the memory subsystem of
the invention is added onto a preexisting STC 8880 product, the buffer manager control
interface 64, the cache buffer 30, and the data interface 68 are added, while the director 12
is controlled to switch the data path in accordance with the instructions of the buffer manager
32.

☐ ▓▓▓▓ Generate Collection ▓▓▓▓ | Print

L2: Entry 97 of 97                          File: USPT                        Oct 9, 1984

US-PAT-NO: 4476526
DOCUMENT-IDENTIFIER: US 4476526 A
** See image for Certificate of Correction **

TITLE: Cache buffered memory subsystem

DATE-ISSUED: October 9, 1984

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Dodd; P. David | Boulder | CO | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|---|---|---|---|---|---|
| Storage Technology Corporation | Louisville | CO | | | 02 |

APPL-NO: 06/ 325346    [PALM]
DATE FILED: November 27, 1981

INT-CL: [03] G06F 13/00

US-CL-ISSUED: 364/200
US-CL-CURRENT: 711/113

FIELD-OF-SEARCH: 364/2MSFile, 364/9MSFile

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

▓▓▓ Search Selected ▓▓▓ | ▓▓▓ Search ALL ▓▓▓ | ▓▓▓ Clear ▓▓▓

|  | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|---|---|---|---|---|
| ☐ | 3566358 | February 1971 | Hasbrouck | 364/200 |
| ☐ | 3735360 | May 1973 | Anderson et al. | 364/200 |
| ☐ | 4075686 | February 1978 | Calle et al. | 364/200 |
| ☐ | 4096567 | June 1978 | Millard et al. | 364/200 |
| ☐ | 4161024 | July 1979 | Joyce et al. | 364/200 |
| ☐ | 4228496 | October 1980 | Katzman et al. | 364/200 |
| ☐ | 4228503 | October 1980 | Waite et al. | 364/200 |
| ☐ | 4271519 | June 1981 | Hall | 371/38 |
| ☐ | 4277844 | July 1981 | Hancock et al. | 371/38 |

OTHER PUBLICATIONS

"Storage Attachment Architecture" by P. David Dodd; May, 1980; Storage Technology Corporation.
IBM Corporation, "IBM 3880 Storage Control Model 11 and Model 13"; Oct. 21, 1981.
IBM Tech. Discl. Bull., vol. 15, No. 11, Apr. 1973, pp. 3463-3464, "Attached Support Processor W/Shared Cache and Execution Unit" by Schmookler.

ART-UNIT: 236

PRIMARY-EXAMINER: Smith; Jerry

ASSISTANT-EXAMINER: Niessen; William G.

ATTY-AGENT-FIRM: Woodcock Washburn Kurtz Mackiewicz & Norris

ABSTRACT:

A buffered cache memory subsystem is disclosed which features a solid-state cache memory connected to a storage director which interfaces a host channel with a control module controlling operation of a long-term data storage device such as a disk drive. The solid-state cache memory is connected to plural directors which in turn may be connected to differing types of control modules, whereby the cache is usable with more than one type of long-term data storage means within a given system. The cache memory may be field-installed in a preexisting disk drive storage system and is software transparent to the host computer, while providing improvements in overall operating efficiency. In a preferred embodiment, data is only cached when it is expected to be the subject of a future host request.

14 Claims, 6 Drawing figures

☐ ▓▓▓ Generate Collection ▓▓▓ | Print

L2: Entry 69 of 97                      File: USPT                Jun 22, 2004

US-PAT-NO: 6754769
DOCUMENT-IDENTIFIER: US 6754769 B2

TITLE: Disk array controller using crossbar switches and method of controlling the same

DATE-ISSUED: June 22, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Kawano; Masafumi | Tokyo | | | JP |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|---|---|---|---|---|---|
| NEC Corporation | Tokyo | | | JP | 03 |

APPL-NO: 09/ 976060   [PALM]
DATE FILED: October 15, 2001

FOREIGN-APPL-PRIORITY-DATA:

| COUNTRY | APPL-NO | APPL-DATE |
|---|---|---|
| JP | 2000-312846 | October 13, 2000 |

INT-CL: [07] G06 F 13/00

US-CL-ISSUED: 711/114; 709/208, 709/209, 709/210, 709/211, 710/1, 710/317, 711/111, 711/112, 711/167
US-CL-CURRENT: 711/114; 709/208, 709/209, 709/210, 709/211, 710/1, 710/317, 711/111, 711/112, 711/167

FIELD-OF-SEARCH: 710/1, 710/317, 379/291, 709/208-211, 711/111, 711/112, 711/114, 711/167

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

▓▓▓ Search Selected ▓▓▓ | ▓▓▓ Search ALL ▓▓▓ | Clear

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|---|---|---|---|---|
| ☐ | 5889969 | March 1999 | Getzlaff et al. | 710/113 |
| ☐ | 6094715 | July 2000 | Wilkinson et al. | 712/20 |
| ☐ | 6578126 | June 2003 | MacLellan et al. | 711/167 |
| ☐ | 6594739 | July 2003 | Walton et al. | 711/155 |
| ☐ | 6611879 | August 2003 | Dobecki | 710/1 |

FOREIGN PATENT DOCUMENTS

| FOREIGN-PAT-NO | PUBN-DATE | COUNTRY | US-CL |
|---|---|---|---|
| 10-143465 | May 1998 | JP | |
| 10-171746 | June 1998 | JP | |
| 11-296473 | October 1999 | JP | |
| 2000-99281 | April 2000 | JP | |
| 2000-099281 | April 2000 | JP | |
| 2002-533835 | October 2002 | JP | |

OTHER PUBLICATIONS

Japanese Office Action dated Dec. 24, 2002, with partial English translation.
Japanese Office Action dated Apr. 8, 2003 with Partial English Translation.

ART-UNIT: 2187

PRIMARY-EXAMINER: Nguyen; T

ATTY-AGENT-FIRM: McGinn & Gibb, PLLC

ABSTRACT:

In a disk array controller, the cache memory has memory modules and a plurality of clossbar switches. A plurality of host computer adapters are connected with the clossbar switches while a plurality of disk enclosure adapters are connected with the clossbar switches. The clossbar switches are connected with the memory modules. The clossbar switches have function to directly connect the host computer adapters to the disk enclosure adapters. Accordingly, data transfer between the host computer and the disk enclosure can be carried out, independent on memory data transfer capability to the cache memory.

22 Claims, 10 Drawing figures

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L2: Entry 66 of 97                          File: USPT               Feb 1, 2005

US-PAT-NO: 6848841
DOCUMENT-IDENTIFIER: US 6848841 B2

TITLE: Optical component connector

DATE-ISSUED: February 1, 2005

INVENTOR-INFORMATION:
NAME                            CITY            STATE    ZIP CODE      COUNTRY
Cochran; Robert A.              Roseville       CA
Robinson; David A.              Loomis          CA

ASSIGNEE-INFORMATION:
NAME                                            CITY      STATE ZIP CODE COUNTRY TYPE CODE
Hewlett-Packard Development Company, L.P.       Houston   TX                            02

APPL-NO: 10/ 237475    [PALM]
DATE FILED: September 9, 2002

INT-CL: [07] G02 B 6/28, G02 B 6/42

US-CL-ISSUED: 385/88; 385/24, 385/14
US-CL-CURRENT: 385/88; 385/14, 385/24

FIELD-OF-SEARCH: 385/14, 385/24, 385/88-94, 385/129-132, 385/15, 385/16, 385/18, 385/31,
385/39, 385/42

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

| Search Selected | Search ALL | Clear |

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|---|---|---|---|---|
| ☐ | 5488682 | January 1996 | Sauter et al. | |
| ☐ | 5726788 | March 1998 | Fee et al. | |
| ☐ | 5896473 | April 1999 | Kaspari | |
| ☐ | 5937133 | August 1999 | Moss et al. | |
| ☐ | 5980312 | November 1999 | Chapman et al. | |
| ☐ | 6172778 | January 2001 | Reinhorn et al. | |
| ☐ | 6233376 | May 2001 | Updegrove | |
| ☐ | 6290400 | September 2001 | Emberty et al. | |
| ☐ | 6318903 | November 2001 | Andrews et al. | |
| ☐ | 6379053 | April 2002 | van Doorn | |

☐ . <u>6402393</u>        June 2002                    Grimes et al.

☐   <u>6661940</u>        December 2003                Kim                                    385/15


ART-UNIT: 2874

PRIMARY-EXAMINER: Ullah; Akm Enayet

ASSISTANT-EXAMINER: Wood; Kevin S.

ABSTRACT:

A system and method for interconnecting electronic components for facilitating shared
communication. The system comprises a translucent optical layer, a plurality of access slots in
the translucent optical layer providing access thereto, and at least one electronic component
having an optical communicator, and an optical interface connector. The optical interface
connector is complementarily matched to at least one of the plurality of access slots. The
optical communicator accesses the translucent optical layer when the at least one electronic
component is inserted into at least one of the plurality of access slots.

22 Claims, 13 Drawing figures

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L2: Entry 56 of 97                         File: PGPB              Jul 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020095551
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020095551 A1

TITLE: Disk array control device with two different internal connection systems

PUBLICATION-DATE: July 18, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Fujimoto, Kazuhisa | Kodaira-shi | | JP | |
| Tanaka, Atsushi | Urawa-shi | | JP | |
| Fujibayashi, Akira | Kokubunji-shi | | JP | |
| Kanai, Hiroki | Higashiyamato-shi | | JP | |
| Minowa, Nobuyuki | Odawara-shi | | JP | |

APPL-NO: 10/ 100117     [PALM]
DATE FILED: March 19, 2002

RELATED-US-APPL-DATA:
Application 10/100117 is a continuation-of US application 09/358374, filed July 21, 1999, US
Patent No. 6385681

FOREIGN-APPL-PRIORITY-DATA:

| COUNTRY | APPL-NO | DOC-ID | APPL-DATE |
|---|---|---|---|
| JP | 10-264286 | 1998JP-10-264286 | September 18, 1998 |

INT-CL: [07] G06 F 13/00

US-CL-PUBLISHED: 711/114; 710/74, 711/113
US-CL-CURRENT: 711/114; 710/74, 711/113

REPRESENTATIVE-FIGURES: 4

ABSTRACT:

A disk array control device which includes a plurality of channel interface (IF) units, a
plurality of disk IF units, a cache memory unit, and a shared memory unit. The connection
system between the plurality of channel IF units and plurality of disk IF units and the cache
memory unit is different from the connection system between the plurality of channel IF units
and plurality of disk IF units and the shared memory unit. In the invention the plurality of
channel IF units and the plurality of disk IF units are connected via a selector to the cache
memory unit whereas the plurality of channel IF units and the plurality of disk IF units are
directly connected to the shared memory unit with no selectors.

[0001] The present application is a continuation of application Ser. No. 09/358,374, filed Jul.
21, 1999, the contents of which are incorporated herein by reference.

☐    Generate Collection    | Print |

L7: Entry 7 of 29          File: USPT          Dec 17, 2002

US-PAT-NO: 6496951
DOCUMENT-IDENTIFIER: US 6496951 B1

TITLE: Method for testing signal integrity in a data storage system

DATE-ISSUED: December 17, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Tuccio; William R. | Sutton | MA | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|---|---|---|---|---|---|
| EMC Corporation | Hopkinton | MA | | | 02 |

APPL-NO: 09/ 474633    [PALM]
DATE FILED: December 29, 1999

INT-CL: [07] G11 C 29/00

US-CL-ISSUED: 714/718; 365/201
US-CL-CURRENT: 714/718; 365/201

FIELD-OF-SEARCH: 714/718, 365/201

PRIOR-ART-DISCLOSED:

### U.S. PATENT DOCUMENTS

| Search Selected | Search ALL | Clear |

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|---|---|---|---|---|
| ☐ | 5206939 | April 1993 | Yanai et al. | 711/4 |
| ☐ | 5574855 | November 1996 | Rosich et al. | 714/41 |
| ☐ | 5953352 | September 1999 | Meyer | 714/820 |
| ☐ | 6327676 | December 2001 | Abramov et al. | 714/37 |

### OTHER PUBLICATIONS

Co-Pending patent application S/N 09/474,886 Entitled "Method and Apparatus for Transmitting Fibre-Channel and Non-Fibre Channel Signals", filed Dec. 29, 1999 and Assigned to Art Unit 2874.
Co-Pending patent application S/N 09/473,668 Entitled "Fibre Channel Data Storage System", filed Dec. 29, 1999 and Assigned to Art Unit 2753.
Co-Pending patent application S/N 09/474,112 Entitled "Fibre Channel Data Storage System Fail-Over Mechanism", filed Dec. 29, 1999 and Assigned to Art Unit 2782.
Co-Pending patent application S/N 09/474,500 Entitled Fibre Channel Data Storage System Having

Improved Rear-End I/O Adapted HUB, filed Dec. 29, 1999 and Assigned to Art Unit 2753.
Co-Pending patent application S/N 09/474,384 Entitled "Fibre Channel Data Storage System Having Improved Front-End I/O Adapted HUB", filed Dec. 29, 1999 and Assigned to Art Unit 2753.

ART-UNIT: 2133

PRIMARY-EXAMINER: Decady; Albert

ASSISTANT-EXAMINER: Chase; Shelly A

ATTY-AGENT-FIRM: Daly, Crowley & Mofford, LLP

ABSTRACT:

A method for testing a data storage system, such system having a host computer coupled to a bank of disk drives through a system interface. The interface includes a plurality of directors and memories interconnected by a plurality of busses for controlling data transfer between the host computer and the bank of disk drives as such data passes through the memories. A portion of the directors is coupled to the host computer. The method includes providing a test printed circuit board having input ports adapted for plugging into a system printed circuit board, such test printed circuit board having a selector section adapted to couple any one of the inputs thereof to a test output on the test printed circuit board. The method includes the steps of: (a) prior to a test mode, removing a director or memory and replacing such removed director or memory with the test printed circuit board; (b) operating the system with the test printed circuit board; (c) selectively coupling the inputs of the test printed circuit board to the test output to examine a signal waveform produced at the test port; and (d) repeating steps (a-c).

3 Claims, 25 Drawing figures

□ ▓▓▓ Generate Collection ▓▓▓ | Print |

L7: Entry 7 of 29                        File: USPT                  Dec 17, 2002

DOCUMENT-IDENTIFIER: US 6496951 B1
TITLE: Method for testing signal integrity in a data storage system

Abstract Text (1):
A method for testing a data storage system, such system having a host computer coupled to a
bank of disk drives through a system interface. The interface includes a plurality of directors
and memories interconnected by a plurality of busses for controlling data transfer between the
host computer and the bank of disk drives as such data passes through the memories. A portion
of the directors is coupled to the host computer. The method includes providing a test printed
circuit board having input ports adapted for plugging into a system printed circuit board, such
test printed circuit board having a selector section adapted to couple any one of the inputs
thereof to a test output on the test printed circuit board. The method includes the steps of:
(a) prior to a test mode, removing a director or memory and replacing such removed director or
memory with the test printed circuit board; (b) operating the system with the test printed
circuit board; (c) selectively coupling the inputs of the test printed circuit board to the
test output to examine a signal waveform produced at the test port; and (d) repeating steps (a-
c).

Brief Summary Text (5):
As is also known, when using the fibre channel communication protocol, if any element in the
channel becomes inoperative, the entire channel becomes inoperative. That is, if the first disk
controller becomes inoperative, or if any one of the disk drives in the set coupled to the
first channel becomes inoperative (i.e., as where the disk interface fails, the disk interface
is inoperative, or removed with its coupled disk drive, or where the disk drive coupled thereto
fails, or is removed), the first fibre channel, is "broken", or open, and becomes inoperative.
The data stored in the entire portion of the set of disk drives coupled to the first disk
channel is therefore unavailable until the inoperative first disk controller or inoperative
disk drive is replaced. This is true with either the first channel or the second channel. One
technique suggested to solve this problem is through the use of a switch, sometimes referred to
as an LRC (i.e., a loop resiliency circuit) switch. Such LRC switch is used to remove an
inoperative disk drive from its channel.

☐ ░░░Generate Collection░░░  |Print|


L7: Entry 2 of 29                          File: USPT                    Nov 16, 2004

US-PAT-NO: 6820175
DOCUMENT-IDENTIFIER: US 6820175 B2

TITLE: Storage system, disk control cluster, and its increase method

DATE-ISSUED: November 16, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|------|------|-------|----------|---------|
| Fujimoto; Kazuhisa | Kokubunji | | | JP |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|------|------|-------|----------|---------|-----------|
| Hitachi, Ltd. | Tokyo | | | JP | 03 |

APPL-NO: 10/ 222831   [PALM]
DATE FILED: August 19, 2002

PARENT-CASE:
CROSS-REFERENCE TO RELATED APPLICATIONS The present invention relates to U.S. patent
application Ser. No. 10/067,332 entitled STORAGE SYSTEM DISK CONTROL CLUSTER filed by K.
FUJIMOTO et al. on Feb. 7, 2002 and U.S. Patent Application Ser. No. 10/212,882 entitled DISK
STORAGE SYSTEM HAVING DISK ARRAY CONNECTED TO DISK ADAPTER THROUGH SWITCHES to be filed by K.
TANAKA et al. claiming priority under 35 USC 119 of Japanese Patent Application No. 2002-
106262.

FOREIGN-APPL-PRIORITY-DATA:

| COUNTRY | APPL-NO | APPL-DATE |
|---------|---------|-----------|
| JP | P2002-077499 | March 20, 2002 |

INT-CL: [07] G06 F 12/00

US-CL-ISSUED: 711/148; 711/112, 711/114, 711/147, 711/170, 711/202, 710/8, 710/14, 710/29,
710/38, 710/52, 710/305, 710/316, 710/317, 709/213, 709/214, 709/218, 709/229, 709/239,
709/249, 709/250, 707/10
US-CL-CURRENT: 711/148; 707/10, 709/213, 709/214, 709/218, 709/229, 709/239, 709/249, 709/250,
710/14, 710/29, 710/305, 710/316, 710/317, 710/38, 710/52, 710/8, 711/112, 711/114, 711/147,
711/170, 711/202

FIELD-OF-SEARCH: 711/112, 711/114, 711/147, 711/148, 711/170, 711/202, 710/8, 710/14, 710/29,
710/38, 710/52, 710/305, 710/316, 710/317, 709/213, 709/214, 709/218, 709/229, 709/239,
709/249, 709/250, 707/10

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

░░Search Selected░░  |  ░░Search ALL░░  |  ░░Clear░░

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|---|---|---|---|---|
| ☐ | 5155845 | October 1992 | Beal et al. | 714/6 |
| ☐ | 6216179 | April 2001 | Murata et al. | 710/8 |
| ☐ | 6457098 | September 2002 | DeKoning et al. | 711/114 |
| ☐ | 2002/0083299 | June 2002 | Van Huben et al. | 712/29 |
| ☐ | 2002/0095549 | July 2002 | Matsunami et al. | 711/114 |
| ☐ | 2003/0130833 | July 2003 | Brownell et al. | 703/23 |

FOREIGN PATENT DOCUMENTS

| FOREIGN-PAT-NO | PUBN-DATE | COUNTRY | US-CL |
|---|---|---|---|
| 2001-256003 | March 2000 | JP | |

OTHER PUBLICATIONS

U.S. patent application No. 10/067,332 filed Feb. 7, 2002, Fujimoto et al, "Storage System, Disk Control Cluster and a Method of Increasing of Disk Control Cluster".

ART-UNIT: 2187

PRIMARY-EXAMINER: Sparks; Donald

ASSISTANT-EXAMINER: Truong; Bao Q

ATTY-AGENT-FIRM: Reed Smith LLP Fisher, Esq.; Stanley P. Marquez, Esq.; Juan Carlos A.

ABSTRACT:

The storage system includes disk control clusters. Each cluster has channel IF units, disk IF units and local shared memory units. The channel IF units, disk IF units and local shared memory units in the plurality of disk control clusters are connected to each other across the disk control clusters by interconnection, global information control unit for storing management information about the disk control clusters is connected to the interconnection. Host computers and the channel IF units of the disk control clusters are connected via front-end switch for storing copy of the management information. Since the front-end switch reflects the contents of the copy of the management information on routing table, an access request from the host computer can be sent to a suitable disk control cluster.

20 Claims, 24 Drawing figures

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# Hit List

**Search Results - Record(s) 1 through 10 of 50 returned.**

☐  1.  Document ID:  US 20050097273 A1

**Using default format because multiple data bases are involved.**

    L4: Entry 1 of 50                          File: PGPB                          May 5, 2005


PGPUB-DOCUMENT-NUMBER: 20050097273
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050097273 A1


TITLE: Storage device controlling device and control method for storage device controlling
device


PUBLICATION-DATE: May 5, 2005


INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Kanai, Hiroki | Odawara | | JP | |


US-CL-CURRENT: 711/114; 711/147


| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |


☐  2.  Document ID:  US 20050071552 A1

    L4: Entry 2 of 50                          File: PGPB                          Mar 31, 2005


PGPUB-DOCUMENT-NUMBER: 20050071552
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050071552 A1


TITLE: Disk array control device with an internal connection system for efficient data transfer


PUBLICATION-DATE: March 31, 2005


INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Fujimoto, Kazuhisa | Kokubunji | | JP | |
| Tanaka, Atsushi | Urawa | | JP | |
| Fujibayashi, Akira | Kokubunji | | JP | |


US-CL-CURRENT: 711/113


| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |


☐  3.  Document ID:  US 20050033914 A1

L4: Entry 3 of 50                              File: PGPB                        Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033914
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033914 A1

TITLE: Disk storage system

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Matsunami, Naoto | Sagamihara-shi | | JP | |
| Oeda, Takashi | Sagamihara-shi | | JP | |
| Yamamoto, Akira | Sagamihara-shi | | JP | |
| Mimatsu, Yasuyuki | Fujisawa-shi | | JP | |
| Sato, Masahiko | Odawara-shi | | JP | |

US-CL-CURRENT: 711/114

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐   4.   Document ID:  US 20050033804 A1

L4: Entry 4 of 50                              File: PGPB                        Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033804
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033804 A1

TITLE: Storage system

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Iwami, Naoko | Sagamihara | | JP | |
| Yamamoto, Yasutomo | Sagamihara | | JP | |
| Fujimoto, Kazuhisa | Kokubunji | | JP | |

US-CL-CURRENT: 709/203; 711/113, 711/114

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐   5.   Document ID:  US 20050027919 A1

L4: Entry 5 of 50                              File: PGPB                        Feb 3, 2005

PGPUB-DOCUMENT-NUMBER: 20050027919
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050027919 A1

TITLE: Disk subsystem

PUBLICATION-DATE: February 3, 2005

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Aruga, Kazuhisa | Odawara-shi | | JP | |

US-CL-CURRENT: 710/316; 711/114

`| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |`

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☐  6.   Document ID:  US 20050005066 A1

L4: Entry 6 of 50                          File: PGPB                          Jan 6, 2005

PGPUB-DOCUMENT-NUMBER: 20050005066
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050005066 A1

TITLE: Storage system and storage device system

PUBLICATION-DATE: January 6, 2005

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Nakayama, Shinichi | Chigasaki | | JP | |
| Gotoh, Youichi | Odawara | | JP | |
| Tamura, Keishi | Odawara | | JP | |

US-CL-CURRENT: 711/117; 711/114, 711/154

`| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |`

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☐  7.   Document ID:  US 20040236908 A1

L4: Entry 7 of 50                          File: PGPB                          Nov 25, 2004

PGPUB-DOCUMENT-NUMBER: 20040236908
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040236908 A1

TITLE: Disk array apparatus and method for controlling the same

PUBLICATION-DATE: November 25, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Suzuki, Katsuyoshi | Odawara | | JP | |
| Hirasawa, Akihisa | Odawara | | JP | |

US-CL-CURRENT: 711/114; 711/113

`| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |`

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☐  8.   Document ID:  US 20040221102 A1

L4: Entry 8 of 50                          File: PGPB                    Nov 4, 2004

PGPUB-DOCUMENT-NUMBER: 20040221102
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040221102 A1

TITLE: Method and apparatus for initialization of storage systems

PUBLICATION-DATE: November 4, 2004

INVENTOR-INFORMATION:
| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Watanabe, Naoki | Sagamihara-shi | | JP | |

US-CL-CURRENT: <u>711</u>/<u>112</u>; <u>711</u>/<u>170</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  9.   Document ID:  US 20040215878 A1

L4: Entry 9 of 50                          File: PGPB                    Oct 28, 2004

PGPUB-DOCUMENT-NUMBER: 20040215878
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040215878 A1

TITLE: Method of controlling storage device controlling apparatus, and storage device
controlling apparatus

PUBLICATION-DATE: October 28, 2004

INVENTOR-INFORMATION:
| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Takata, Yutaka | Kanagawa | | JP | |
| Nakayama, Shinichi | Kanagawa | | JP | |
| Ogasawara, Hiroshi | Kanagawa | | JP | |
| Shikawa, Jinichi | Chiba | | JP | |
| Saika, Nobuyuki | Kanagawa | | JP | |

US-CL-CURRENT: <u>711</u>/<u>114</u>; <u>711</u>/<u>202</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  10.   Document ID:  US 20040205294 A1

L4: Entry 10 of 50                          File: PGPB                    Oct 14, 2004

PGPUB-DOCUMENT-NUMBER: 20040205294
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040205294 A1

TITLE: Method of controlling storage device controlling apparatus, and storage device controlling apparatus

PUBLICATION-DATE: October 14, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Nakayama, Shinichi | Kanagawa | | JP | |
| Ogasawara, Hiroshi | Kanagawa | | JP | |
| Kobayashi, Naotaka | Kanagawa | | JP | |
| Shikawa, Jinichi | Chiba | | JP | |
| Saika, Nobuyuki | Kanagawa | | JP | |

US-CL-CURRENT: 711/114; 711/202

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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| Terms | Documents |
|-------|-----------|
| L1 and L3 | 50 |

**Display Format:** - [ ] Change Format

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# Hit List

## Search Results - Record(s) 11 through 20 of 50 returned.

☐ 11. Document ID: US 20040193799 A1

**Using default format because multiple data bases are involved.**

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L4: Entry 11 of 50                          File: PGPB                    Sep 30, 2004


PGPUB-DOCUMENT-NUMBER: 20040193799
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040193799 A1

TITLE: Disk array control device with an internal connection system for efficient data transfer

PUBLICATION-DATE: September 30, 2004

INVENTOR-INFORMATION:
NAME                          CITY              STATE       COUNTRY        RULE-47
Fujimoto, Kazuhisa    -        Kokubunji                     JP
Tanaka, Atsushi                Urawa                         JP
Fujibayashi, Akira             Kokubunji                     JP

US-CL-CURRENT: 711/114; 711/113
```

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

☐ 12. Document ID: US 20040158673 A1

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L4: Entry 12 of 50                          File: PGPB                    Aug 12, 2004


PGPUB-DOCUMENT-NUMBER: 20040158673
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040158673 A1

TITLE: Disk storage system including a switch

PUBLICATION-DATE: August 12, 2004

INVENTOR-INFORMATION:
NAME                          CITY              STATE       COUNTRY        RULE-47
Matsunami, Naoto               Sagamihara-shi                JP
Oeda, Takashi                  Sagamihara-shi                JP
Yamamoto, Akira                Sagamihara-shi                JP
Mimatsu, Yasuyuki              Fujisawa-shi                  JP
Sato, Masahiko                 Odawara-shi                   JP

US-CL-CURRENT: 711/114
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| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐　13.　Document ID: US 20040128456 A1

L4: Entry 13 of 50　　　　　　　　　　　　File: PGPB　　　　　　　　Jul 1, 2004

PGPUB-DOCUMENT-NUMBER: 20040128456
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040128456 A1

TITLE: Storage system and data backup method for the same

PUBLICATION-DATE: July 1, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Kobayashi, Naotaka | Odawara | | JP | |
| Yokohata, Shizuo | Ninomiya | | JP | |

US-CL-CURRENT: 711/162; 711/112

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐　14.　Document ID: US 20040111560 A1

L4: Entry 14 of 50　　　　　　　　　　　　File: PGPB　　　　　　　　Jun 10, 2004

PGPUB-DOCUMENT-NUMBER: 20040111560
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040111560 A1

TITLE: Disk array controller

PUBLICATION-DATE: June 10, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Takase, Masayuki | Kokubunji | | JP | |
| Fujimoto, Kazuhisa | Kokubunji | | JP | |

US-CL-CURRENT: 711/114; 711/113

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐　15.　Document ID: US 20040107325 A1

L4: Entry 15 of 50　　　　　　　　　　　　File: PGPB　　　　　　　　Jun 3, 2004

PGPUB-DOCUMENT-NUMBER: 20040107325
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040107325 A1

TITLE: Storage system, storage system control method, and storage medium having program recorded thereon

PUBLICATION-DATE: June 3, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Mori, Akihiro | Odawara | | JP | |

US-CL-CURRENT: 711/162; 711/114

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  16.   Document ID:  US 20040083338 A1

L4: Entry 16 of 50                          File: PGPB                          Apr 29, 2004

PGPUB-DOCUMENT-NUMBER: 20040083338
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040083338 A1

TITLE: Disk array controller

PUBLICATION-DATE: April 29, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Moriwaki, Norihiko | Hachioji | | JP | |
| Fujimoto, Kazuhisa | Kokubunji | | JP | |

US-CL-CURRENT: 711/114; 711/112, 711/113

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  17.   Document ID:  US 20040064637 A1

L4: Entry 17 of 50                          File: PGPB                          Apr 1, 2004

PGPUB-DOCUMENT-NUMBER: 20040064637
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040064637 A1

TITLE: Broadcast system in disk array controller

PUBLICATION-DATE: April 1, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Fujibayashi, Akira | Kokubunji | | JP | |
| Tanaka, Atsushi | Urawa | | JP | |
| Minowa, Nobuyuki | Odawara | | JP | |
| Mikami, Hikari | Odawara | | JP | |
| Nanao, Hisashi | Fujisawa | | JP | |

US-CL-CURRENT: 711/113; 711/114

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

☐  18.   Document ID:  US 20040024951 A1

L4: Entry 18 of 50                           File: PGPB                        Feb 5, 2004

PGPUB-DOCUMENT-NUMBER: 20040024951
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040024951 A1

TITLE: Disk subsystem

PUBLICATION-DATE: February 5, 2004

INVENTOR-INFORMATION:
| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Aruga, Kazuhisa | Odawara-shi | | JP | |

US-CL-CURRENT: 710/316; 711/114

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

☐  19.   Document ID:  US 20040010662 A1

L4: Entry 19 of 50                           File: PGPB                        Jan 15, 2004

PGPUB-DOCUMENT-NUMBER: 20040010662
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040010662 A1

TITLE: Disk subsystem

PUBLICATION-DATE: January 15, 2004

INVENTOR-INFORMATION:
| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Aruga, Kazuhisa | Odawara-shi | | JP | |

US-CL-CURRENT: 711/114; 710/316

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

☐  20.   Document ID:  US 20030200377 A1

L4: Entry 20 of 50                           File: PGPB                        Oct 23, 2003

PGPUB-DOCUMENT-NUMBER: 20030200377
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030200377 A1

TITLE: Disk array control device with two different internal connection systems

PUBLICATION-DATE: October 23, 2003

```
INVENTOR-INFORMATION:
NAME                              CITY                           STATE     COUNTRY      RULE-47
Fujimoto, Kazuhisa                Kodaira-shi                              JP
Tanaka, Atsushi                   Urawa-shi                                JP
Fujibayashi, Akira                Kokubunji-shi                            JP
Kanai, Hiroki                     Higashiyamato-shi                        JP
Minowa, Nobuyuki                  Odawara-shi                              JP
```

US-CL-CURRENT: <u>710</u>/<u>316</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

| Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS |

| Terms | Documents |
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| L1 and L3 | 50 |

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## Search Results - Record(s) 21 through 30 of 50 returned.

☐ 21. Document ID: US 20030191892 A1

**Using default format because multiple data bases are involved.**

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L4: Entry 21 of 50                    File: PGPB                    Oct 9, 2003


PGPUB-DOCUMENT-NUMBER: 20030191892
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030191892 A1


TITLE: Disk array control device with an internal connection system for efficient data transfer


PUBLICATION-DATE: October 9, 2003


INVENTOR-INFORMATION:
NAME                          CITY              STATE      COUNTRY        RULE-47
Fujimoto, Kazuhisa            Kokubunji                    JP
Tanaka, Atsushi               Urawa                        JP
Fujibayashi, Akira            Kokubunji                    JP


US-CL-CURRENT: 711/114
```

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

☐ 22. Document ID: US 20030191891 A1

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L4: Entry 22 of 50                    File: PGPB                    Oct 9, 2003


PGPUB-DOCUMENT-NUMBER: 20030191891
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030191891 A1


TITLE: Disk storage system having disk arrays connected with disk adaptors through switches


PUBLICATION-DATE: October 9, 2003


INVENTOR-INFORMATION:
NAME                          CITY              STATE      COUNTRY        RULE-47
Tanaka, Katsuya               Kokubunji                    JP
Fujimoto, Kazuhisa            Kokubunji                    JP


US-CL-CURRENT: 711/114; 711/154
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| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

☐ 23. Document ID: US 20030191890 A1

L4: Entry 23 of 50                                  File: PGPB                        Oct 9, 2003

PGPUB-DOCUMENT-NUMBER: 20030191890
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030191890 A1

TITLE: Disk subsystem and a method for controlling the disk subsystem

PUBLICATION-DATE: October 9, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Okamoto, Takeki | Odawara | | JP | |
| Satoh, Takao | Odawara | | JP | |

US-CL-CURRENT: 711/112; 711/113

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  24.   Document ID:  US 20030131192 A1

L4: Entry 24 of 50                                  File: PGPB                        Jul 10, 2003

PGPUB-DOCUMENT-NUMBER: 20030131192
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030131192 A1

TITLE: Clustering disk controller, its disk control unit and load balancing method of the unit

PUBLICATION-DATE: July 10, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Nakamura, Shuji | Odawara | | JP | |
| Fujimoto, Kazuhisa | Kokubunji | | JP | |
| Kanai, Hiroki | Higashiyamato | | JP | |
| Yoshida, Akira | Hatano | | JP | |

US-CL-CURRENT: 711/114

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  25.   Document ID:  US 20030084237 A1

L4: Entry 25 of 50                                  File: PGPB                        May 1, 2003

PGPUB-DOCUMENT-NUMBER: 20030084237
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030084237 A1

TITLE: Disk array controller

PUBLICATION-DATE: May 1, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Yoshida, Akira | Hadano | | JP | |
| Nakamura, Shuji | Odawara | | JP | |

US-CL-CURRENT: <u>711</u>/<u>112</u>; <u>711</u>/<u>113</u>, <u>711</u>/<u>118</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  26.    Document ID: US 20020095551 A1

L4: Entry 26 of 50                               File: PGPB                          Jul 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020095551
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020095551 A1

TITLE: Disk array control device with two different internal connection systems

PUBLICATION-DATE: July 18, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Fujimoto, Kazuhisa | Kodaira-shi | | JP | |
| Tanaka, Atsushi | Urawa-shi | | JP | |
| Fujibayashi, Akira | Kokubunji-shi | | JP | |
| Kanai, Hiroki | Higashiyamato-shi | | JP | |
| Minowa, Nobuyuki | Odawara-shi | | JP | |

US-CL-CURRENT: <u>711</u>/<u>114</u>; <u>710</u>/<u>74</u>, <u>711</u>/<u>113</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐  27.    Document ID: US 20020095549 A1

L4: Entry 27 of 50                               File: PGPB                          Jul 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020095549
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020095549 A1

TITLE: Disk storage system

PUBLICATION-DATE: July 18, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|------|------|-------|---------|---------|
| Matsunami, Naoto | Sagamihara-shi | | JP | |
| Oeda, Takashi | Sagamihara-shi | | JP | |
| Yamamoto, Akira | Sagamihara-shi | | JP | |
| Mimatsu, Yasuyuki | Fujisawa-shi | | JP | |
| Sato, Masahiko | Odawara-shi | | JP | |

US-CL-CURRENT: <u>711</u>/<u>114</u>; <u>710</u>/<u>317</u>, <u>710</u>/<u>74</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐ 28.    Document ID: US 20020091898 A1

L4: Entry 28 of 50                              File: PGPB                        Jul 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020091898
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020091898 A1

TITLE: Disk storage system

PUBLICATION-DATE: July 11, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Matsunami, Naoto | Sagamihara-shi | | JP | |
| Oeda, Takashi | Sagamihara-shi | | JP | |
| Yamamoto, Akira | Sagamihara-shi | | JP | |
| Mimatsu, Yasuyuki | Fujisawa-shi | | JP | |
| Sato, Masahiko | Odawara-shi | | JP | |

US-CL-CURRENT: <u>711</u>/<u>114</u>; <u>710</u>/<u>316</u>, <u>710</u>/<u>74</u>, <u>711</u>/<u>170</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐ 29.    Document ID: US 20020046323 A1

L4: Entry 29 of 50                              File: PGPB                        Apr 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020046323
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020046323 A1

TITLE: Disk array controller capable of transferring data at a high speed and method of
controlling the same

PUBLICATION-DATE: April 18, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Kawano, Masafumi | Tokyo | | JP | |

US-CL-CURRENT: <u>711</u>/<u>114</u>

| Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image |

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☐ 30.    Document ID: US 6886086 B2

L4: Entry 30 of 50                         File: USPT                        Apr 26, 2005

US-PAT-NO: 6886086
DOCUMENT-IDENTIFIER: US 6886086 B2

TITLE: Storage system and data backup method for the same

| Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw Desc | Image |

| Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS |

| Terms | Documents |
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United States Patent
Beppu

(10) Patent No.:     US 6,256,762 B1
(45) Date of Patent:     Jul. 3, 2001

(54)   SEMICONDUCTOR DISK DEVICE

(75)   Inventor:   Atsushi Beppu, Tokyo (JP)

(73)   Assignee:   Oki Electric Industry Co., Ltd., Tokyo (JP)

(*)    Notice:   Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21)   Appl. No.:   09/155,497

(22)   PCT Filed:   Jan. 23, 1998

(86)   PCT No.:   PCT/JP98/00266
       § 371 Date:   Sep. 23, 1998
       § 102(e) Date:   Sep. 23, 1998

(87)   PCT Pub. No.:   WO98/33112
       PCT Pub. Date:   Jul. 30, 1998

(30)   Foreign Application Priority Data

Jan. 23, 1997   (JP) ......................................... 9-024437

(51)   Int. Cl.⁷ ......................................... G11C 29/00
(52)   U.S. Cl. ......................................... 714/763

(58)   Field of Search ......................... 714/763, 764, 714/767, 769; 365/189.09

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| 5,603,001 | * | 2/1997 | Sukegawa et al. | 711/103 |
| 5,673,383 | * | 9/1997 | Sukegawa | 714/6 |
| 5,717,886 | * | 2/1998 | Miyauchi | 711/103 |
| 5,742,934 | * | 4/1998 | Shinohara | 711/103 |
| 5,754,567 | * | 5/1998 | Norman | 714/773 |

* cited by examiner

Primary Examiner—Albert Decady
Assistant Examiner—Shelly A Chase
(74) Attorney, Agent, or Firm—Venable; Robert J. Frank; Catherine M. Voorhees

(57)                ABSTRACT

In a semiconductor disk unit, one sector data to be stored in a memory part is divided into a plurality of banks, and ECC data is prepared every bank so as to enhance the function of correcting errors even if there occur many error bits.

12 Claims, 9 Drawing Sheets